

## WHAT IS CLAIMED IS:

Sub a' 1. A picture encoding system conversion device comprising:

a decoder receiving picture codes, compressed in information volume, from a reception side transmission channel via an input buffer and expanding the received picture codes to output expanded picture codes;

an encoder compressing the picture codes, decoded by said decoder, in information volume, to generate picture codes to output generated picture codes from an output buffer to a sending side transmission channel; and

a transcoder controller controlling said encoder;

wherein

said transcoder controller includes

an input buffer monitor monitoring said input buffer of said decoder;

an output buffer monitor monitoring said output buffer of said encoder; and

a quantization step controller modifying a quantization step in compression processing of said encoder based on the information from said input buffer monitor and said output buffer monitor.

2. The picture encoding system conversion device as defined in claim 1,

wherein

said decoder includes a variable length a decoder unit;

5        said transcoder controller further includes a decoder  
monitor monitoring said variable length decoder unit;

10        said quantization step controller modifying the  
quantization step of said encoder based on the information from  
said input buffer monitor, said output buffer monitor and the  
decoder monitor.

3.    The picture encoding system conversion device as defined in  
claim 1,

wherein

5        said transcoder controller includes a reception side  
transmission channel monitor monitoring the state of said  
receiving side transmission channel, and

6        a sending side transmission channel monitor monitoring the  
state of said sending side transmission channel;

10        said quantization step controller modifying the  
quantization step of said encoder based on the information from  
said input buffer monitor, said output buffer monitor, the  
reception side transmission channel monitor and the sending side  
transmission channel monitor.

4.    The picture encoding system conversion device as defined in  
claim 1,

wherein

5        said decoder includes a variable length decoding unit;

6        said transcoder controller further includes a decoder  
monitor monitoring said variable length decoding unit,

a reception side transmission channel monitor monitoring the state of said reception side transmission channel, and

a sending side transmission channel monitor monitoring the state of said sending side transmission channel;

said quantization step controller modifying the quantization step of said encoder based on the information from said input buffer monitor, said output buffer monitor, said decoder monitor, the reception side transmission channel monitor and the sending side transmission channel monitor.

5. A code rate conversion device comprising:

a code rate conversion unit receiving picture codes compressed in information volume from a reception side transmission channel by an input buffer, converting the code rate of the picture codes and subsequently sending out the resultant picture codes through an output buffer to a sending side transmission channel; and

a transcoder controller controlling said code rate; wherein

said transcoder controller includes an input buffer monitor monitoring said input buffer;

output buffer monitor monitoring the output buffer; and

a quantization step controller modifying a quantization step in compression processing of said code rate conversion unit based on the information from said input buffer monitor and said output buffer monitor.

6. The code rate conversion device as defined in claim 5  
wherein

said code rate conversion unit includes a variable length  
decoding unit;

5 said transcoder controller includes a decoder monitor  
monitoring said variable length decoding unit;

said quantization step controller modifying the  
quantization step of the code rate conversion unit based on the  
information from said input buffer monitor, said output buffer  
10 monitor and said decoder monitor.

7. The code rate conversion device as defined in claim 5  
wherein

said transcoder controller further includes a reception  
side transmission channel monitor monitoring the state of said  
5 reception side transmission channel; and

a sending transmission channel monitor monitoring the  
state of said sending out transmission channel;

said quantization step controller modifying the  
quantization step of the code rate conversion unit based on the  
10 information from said input buffer monitor, said output buffer  
monitor, the reception side transmission channel monitor and the  
sending side transmission channel monitor.

8. The code rate conversion device as defined in claim 5  
wherein

said code rate conversion unit includes a variable length

decoding unit;

5        said transcoder controller includes a decoder monitor  
monitoring said variable length decoding unit, a reception  
transmission channel monitor monitoring the state of said  
reception side transmission channel and a sending transmission  
channel monitor monitoring the state of said a sending out  
10        transmission channel;

      said quantization step controller modifying a quantization  
step of said code rate conversion unit based on the information  
from said input buffer monitor, said output buffer monitor, said  
decoder monitor, the reception side transmission channel  
15        monitor and the sending side transmission channel monitor.

9.    An encoding system conversion device for converting a signal  
encoded in one encoding system into a signal of another encoding  
system, comprising:

      a decoder unit being fed with a compression-coded signal  
5        in an input buffer to decode the signal in a variable length  
decoder;

      an encoder unit being fed with a signal output from said  
decoder unit, having an orthogonal transform unit orthogonally  
transforming the input signal, having a quantizer quantizing  
10        coefficients resulting from the orthogonal transform unit, and  
having a variable length encoder compression-encoding the  
quantized coefficients to output the compression-coded  
quantized coefficients from an output buffer; and

a transcoder controller having:

15 means for monitoring at least the state of said output buffer, and

means for modifying a quantization step in said quantizer (a) to decrease the code volume generated in said encoder if the stored volume in said output buffer exceeds a preset value to produce overflow, and for modifying the quantization step in said quantizer (b) to decrease the code volume generated in said encoder if the stored volume in said output buffer is not up to said preset value to produce underflow.

20 10. An encoding system conversion device for converting a signal encoded in one encoding system into a signal of another encoding system, comprising:

5 a decoder unit being fed with a compression-coded signal in an input buffer to decode the signal in a variable length decoder;

an encoder unit being fed with a signal output from said decoder unit, having an orthogonal transform unit orthogonally transforming the input signal, having a quantizer quantizing coefficients resulting from the orthogonal transformation, having a variable length encoder compression-encoding the quantized coefficients and having an output buffer outputting compression-coded quantized coefficients to the sending side transmission channel;

15 an input buffer monitor monitoring the state of said input

buffer;

an output buffer monitor monitoring the state of said output buffer;

means for acquiring the information of said reception side transmission channel and the information of said sending side transmission channel; and

a transcoder controller unit having a quantization step controller;

said quantization step controller variably controlling a quantization step of said quantizer, from the monitoring information for said input buffer and the monitoring information for said output buffer, based on the code volume per processing unit upon converting the picture encoding system, said variably controlling being performed in a fashion:

(a) that, if the band of said reception side transmission channel is equal to that of said sending side transmission channel, the pre-conversion code volume will be equal to the post-conversion code volume, and

(b) that, if the band of said reception side transmission channel is different from that of said sending side transmission channel, the post-conversion code volume will coincide with the pre-conversion code volume multiplied with a ratio between bands of said reception side transmission channel and said sending side transmission channel.

11. The encoding system conversion device as defined in claim

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wherein

5 said transcoder controller unit further includes a decoder monitor fed with encoding parameters output from said variable length decoder;

said quantization step controller determining the quantization step of said quantizer using said encoding parameters.

12. The encoding system conversion device as defined in claim 10

wherein

5 said transcoder controller unit further includes a decoder monitor fed with encoding parameters output from said variable length decoder;

said quantization step controller determining the quantization step of said quantizer using said encoding parameters.

13. The encoding system conversion device as defined in claim 11

wherein

5 the quantization step of said quantizer is finely adjusted, with the quantization step output from said decoder monitor, as an initial value, responsive to the state of said output buffer, pre-conversion code volume and said post-conversion code volume.



14. The encoding system conversion device as defined in claim  
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wherein

the quantization step of said quantizer is finely adjusted,  
5 with the quantization step output from said decoder monitor, as  
an initial value, responsive to the state of said output buffer,  
pre-conversion code volume and said post-conversion code  
volume.

15. A code rate conversion device for converting a signal  
encoded in one encoding system into a signal of another encoding  
system, comprising:

a code rate conversion unit and a transcoder controller;

5 said code rate conversion unit at least including:

an input buffer fed from a reception side transmission  
channel with a signal compressed in information volume,

a variable length decoder decoding the signal,

10 an inverse quantizer inverse-quantizing an output of said  
variable length decoder,

an adder directly outputting an output of said inverse  
quantizer or outputting a value corresponding to said inverse  
quantizer output minus an orthogonal transformed difference  
between a current picture and a preceding frame picture,

15 a quantizer quantizing an output of said adder, and  
a variable length decoder,

said code rate conversion unit sending out a code rate

converted signal from the output buffer; and

said transcoder controller having:

20 an output buffer monitor monitoring at least the state of said output buffer,

25 a quantization step modifier modifying a quantization step in said quantizer to decrease generating code volume if the stored volume in said output buffer exceeds a preset value resulting in overflow,

said modifier modifying the quantization step in said quantizer to decrease generating code volume if the stored volume in said output buffer is not up to said preset value resulting in underflow.

16. A code rate conversion device for converting a signal encoded in one encoding system into a signal of another encoding system, comprising:

(a) a code rate conversion unit at least including: (a1)  
5 an input buffer fed from a reception side transmission channel with a signal compressed in information volume, (a2) a variable length decoder decoding the signal, (a3) an inverse quantizer inverse-quantizing an output of said variable length decoder, (a4) an adder directly outputting an output of said inverse  
10 quantizer or outputting a value corresponding to said inverse quantizer output minus an orthogonal transformed difference between a current picture and a preceding frame picture, (a5) a quantizer quantizing an output of said adder, and (a6) a

variable length decoder, said code rate conversion unit sending  
15 out a code rate converted signal from the output buffer;

(b) an input buffer monitor monitoring the state of said  
input buffer;

(c) an output buffer monitor monitoring the state of said  
output buffer;

20 (d) means for acquiring information on said reception side  
transmission channel and information on said sending side  
transmission channel; and

(e) a transcoder controller having a quantization step  
controller;

25 said quantization step controller variably controlling a  
quantization step of said quantizer, from the monitoring  
information for said input buffer and the monitoring information  
for said output buffer, based on the code volume per processing  
unit in converting the picture encoding system, so that, if a  
30 band of said reception side transmission channel is equal to that  
of said sending side transmission channel, the pre-conversion  
code volume will be equal to the post-conversion code volume,  
and so that, if a band of said reception side transmission  
channel is different from that of said sending side transmission  
35 channel, the post-conversion code volume will coincide with the  
pre-conversion code volume multiplied with a ratio between the  
band of said reception side transmission channel and the band  
of said sending side transmission channel.

17. The code rate conversion device as defined in claim 15 wherein

said transcoder controller further includes a decoder monitor having encoding parameters output from said variable length decoder as an input;

said quantization step controller determining the quantization step of said quantizer using said encoding parameters.

18. The code rate conversion device as defined in claim 16 wherein

said transcoder controller further includes a decoder monitor having encoding parameters output from said variable length decoder as an input;

said quantization step controller determining the quantization step of said quantizer using said encoding parameters.

19. A picture code rate conversion device comprising:

(a) a decoder, (b) an encoder and (c) a transcoder controller;

said decoder (a) including:

(a1) an input buffer unit receiving compression-coded picture codes from a reception side transmission channel;

(a2) a variable length decoder decoding picture codes of said input buffer unit;

(a3) a first IDCT unit inverse-discrete-cosine-

10 transforming an output of said variable length decoder;

(a4) a first adder on one input end of which an output of said first IDCT unit is fed;

(a5) a first frame memory unit receiving and memorizing an output of said first adder; and

15 (a6) a first motion compensation prediction unit receiving an output of said variable length decoder and an output of said first frame memory unit;

said encoder (b) including

20 (b1) a second adder receiving, at one input end thereof, an output of said decoder;

(b2) a DCT unit discrete-cosine-transforming an output of said second adder;

(b3) a quantizer quantizing an output of said DCT unit;

25 (b4) a variable-length encoder receiving an output of said quantizer;

(b5) an output buffer receiving an output of said variable length decoder to output this output to a sending side transmission channel;

30 (b6) a second inverse quantizer inverse-quantizing an output of said quantizer;

(b7) a second IDCT unit inverse-discrete-cosine-transforming an output of said second inverse quantizer;

(b8) a third adder receiving, at an input end thereof, an output of said second IDCT unit;

35 (b9) a second frame memory unit receiving and memorizing  
an output of said third adder; and

(b10) a second motion compensation prediction receiving an  
output of said second frame memory unit and an output of said  
first motion compensation prediction unit;

40 (b11) an output of said second motion compensation  
prediction unit being fed to the other input end of said second  
and third adder; and

said transcoder (c) controller including:

45 (c1) an encoder receiving, at the other input ends of said  
second and third adders thereof, an output of said second motion  
compensation prediction unit;

(c2) an input buffer monitor monitoring said input buffer;  
output buffer monitor monitoring said output buffer; and  
a quantization step controller variably controlling a  
50 quantization step of said quantizer of said encoder based on the  
monitoring information output from said input buffer monitor and  
said output buffer monitor.

20. The picture code rate conversion device as defined in claim  
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wherein

5 said transcoder controller further includes at least one  
selected from the group consisting of a reception channel  
monitor monitoring one of said reception side transmission  
channel, a sending channel monitor monitoring said sending side

transmission channel and a variable length decoder monitor  
receiving encoding parameters output from said variable length  
10 decoder to monitor said variable length decoder;

said quantization step controller variably controlling the  
quantization step of said quantizer of said encoder based on the  
monitoring information output from said respective monitors.

21. A picture code rate conversion device comprising:

(a) a coding rate conversion unit and (b) a transcoder  
controller unit;

said coding rate conversion unit (a) including:

5 (a1) an input buffer unit receiving a signal from a  
reception side transmission channel;

(a2) a variable length decoding unit decoding picture codes  
of said input buffer unit;

10 (a3) a first IDCT unit inverse-discrete-cosine-  
transforming an output of said first variable length decoder;

(a4) a first adder on one input end of which an output of  
said first IDCT unit is fed;

(a5) a quantizer quantizing an output of said first adder;

15 (a6) a variable length encoder encoding an output of said  
quantizer to output an encoded signal;

(a7) an output buffer receiving the encoded signal from  
said variable length encoder to output a resulting output to a  
sending side transmission channel;

(a8) a second inverse quantizer inverse-quantizing an

20 output of said quantizer;

(a9) a second adder subtracting an output of said first adder from an output of said second inverse quantizer to output a resulting difference signal;

25 (a10) an IDCT unit receiving an output of said second adder as an input;

(a11) a frame memory unit receiving and storing an output of said IDCT unit;

30 (a12) a difference calculating unit taking a difference between a current picture output from said variable length decoding unit and a picture one frame before from said frame memory unit; and

(a13) a DCT unit receiving an output of said difference calculating unit as an input;

35 (a14) wherein said first adder outputs a value obtained by subtracting an output of said IDCT from an output of said first inverse quantizing unit;

said transcoder controller unit (b) including:

(b1) an input buffer monitor monitoring said input buffer;

40 (b2) an output buffer monitor monitoring said output buffer; and

(b3) quantization step controller variably controlling a quantization step of said quantizer of said encoder based on the monitoring information output from said input buffer monitor and said output buffer monitor.



22. The code rate conversion device as defined in claim 18 wherein

said transcoder controller unit further includes a reception channel monitor monitoring one of said reception side transmission channel, a said reception side transmission channel, a sending channel monitor monitoring said sending side transmission channel, and a variable length decoder receiving encoding parameters output from said variable length decoder to monitor said variable length decoder;

said quantization step controller variably controlling a quantization step of said quantizer of said encoder based on the monitoring information output from said respective monitors.